**Predicting Future Changes in $O_3$ and OH: Three-Dimensional Global Model Studies**

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Man's activities may significantly affect the concentrations of a number of chemically and radiatively important tropospheric gases, including ozone ($O_3$), the hydroxyl radical (OH), nitrogen oxides ($NO_x$), and peroxyacetyl nitrate (PAN). Ozone is formed when carbon monoxide (CO), methane ($CH_4$), and $NO_x$ react in the presence of sunlight. Ozone can absorb both ultraviolet and infrared radiation. Hydroxyl radical formation in the troposphere is initiated by the photolysis of $O_3$. Reaction with the hydroxyl radical is the main loss for many tropospheric species. Thus, both $O_3$ and OH play key roles in global chemical and climate changes.

The equations governing the concentrations of tropospheric species are highly non-linear. Predicting how changes in source emissions affect concentrations globally is not straightforward. We have developed a global, three-dimensional, chemistry-transport model (CTM) of the troposphere that includes the oxidation cycles of CO, $CH_4$, and non-methane hydrocarbons (NMHCs). The model predicts the concentrations of 76 species, including $O_3$, OH, PAN, NO, $NO_2$, $HNO_3$, CO, isoprene, and other NMHCs. Here we present results of a baseline present-day scenario, and scenarios which quantify how reductions and increases in source emissions affect the global distributions of a number of species.

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